TRAINING REQUIREMENTS ANALYSIS
452X3

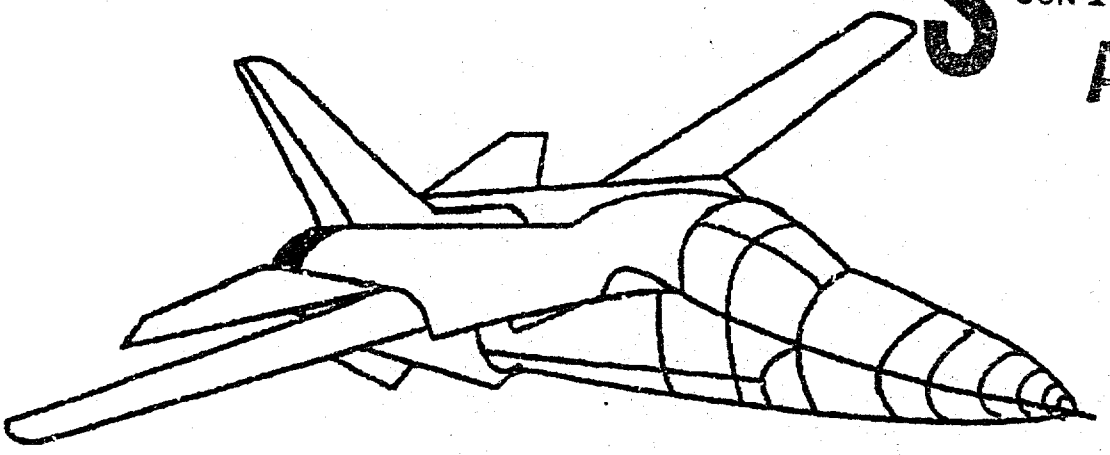
(1)

F-111 AVIONIC SYSTEMS

ATTACK CONTROL

INSTRUMENT AND FLIGHT CONTROL

COMMUNICATION, NAVIGATION, AND PENETRATION AIDS



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A SPECIAL THANKS TO THE MANY HARD-WORKING F-111 AVIONICS SYSTEMS PERSONNEL AND SUPERVISORS FOR THEIR EXPERTISE AND OUTSTANDING SUPPORT ON THIS PROJECT.

TABLE OF CONTENTS

PAGES

EXECUTIVE SUMMARY

Purpose 1
Procedures 1
Results 1

SPECIALTY OVERVIEW

Background 3
Mission Description 3
Manning 4
Training Currently Available 4
Specialty Concerns 5
Advanced Technology Training Delivery (ATTD) Systems 6
Future Plans 7

TRA DEVELOPMENT PROCEDURES

Planning 8
TRA Task List Development 8
Data Collection 8

RESULTS

Common Skills and Knowledge 11
General Training Recommendations 11
Specific Training Recommendations 13

APPENDICES

A. Comparison of Skill and Knowledge Requirements 14
B. Common Skill and Knowledge Requirements 19
C. Specific Training Recommendations 21
D. Electronic Fundamentals/Applications (EFA) TRA Task Correlation 55
E. Acronym List 61

VOLUME II - Task Analysis (AFSC 452X3)

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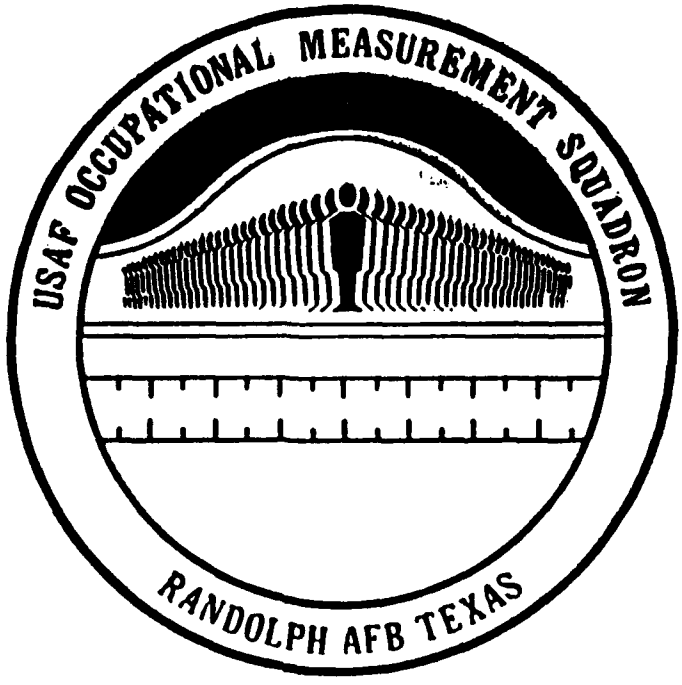

F-111 AVIONICS SYSTEMS SPECIALIST/TECHNICIAN (AFSC 452X3)

TRAINING REQUIREMENTS ANALYSIS PREPARED BY

3400 TRAINING SUPPORT SQUADRON

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PREFACE

The United States Air Force Occupational Measurement Squadron (USAFOMS), Occupational Analysis Flight (OMY), is assigned primary responsibility for developing occupational survey reports (OSRs) and training requirements analyses (TRAs) for Air Force specialties. OSRs summarize the results of occupational surveys and identify the structure of the career ladder in terms of jobs performed. TRAs identify the activity, skill, and knowledge requirements needed to perform those jobs, as well as specific training needs for each specialty. Together, OSRs and TRAs provide a basis for revision or development of specialty training standards (STSs), course training standards (CTSs), initial skills training, on-the-job training (OJT), and career development courses (CDCs). TRAs fulfill most requirements of steps 1 and 2 of the Instructional System Development (ISD) model prescribed in AFR 50-8, Policy and Guidance for Instructional System Development (ISD).

The Air Training Command Training Staff Officer (HQ ATC/TTOA) requested this TRA, in conjunction with an OSR, to provide task analysis data for use in updating initial skills and follow-on courses for the 452X3 career ladder. Copies of this report are available to Air Staff sections, MAJCOMs, the OJT community, and other interested training and management officials upon request. Address requests to USAFOMS/OMY, Randolph AFB TX 78150-5000 or 3400 TSS/OMS, Lowry AFB CO 80230-5000.

This volume consists of three sections: Specialty Overview, TRA Development Procedures, and Results. In addition, the task analysis volume contains a detailed examination of all AFSC 452X3 specialty-unique tasks.

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EXECUTIVE SUMMARY

Purpose

The purpose of this training requirements analysis (TRA) is to assist in determining training requirements for F-111 Avionics Systems personnel in light of recent RIVET WORKFORCE (RWF) restructuring efforts. The information may be used to evaluate the adequacy, feasibility, and efficiency of the training provided within this rapidly changing specialty.

Procedures

Data for this TRA were gathered by means of field interviews with F-111 Avionics Systems personnel. The TRA task list was extracted from the February 1989 452X3 USAF Job Inventory (JI). A total of 45 subject-matter experts (SMEs) at 2 TAC bases and 1 SAC base were interviewed to gather task data and other training decision data. In addition, system overview information was gathered from HQ USAF, the TAC functional manager, and members of Lowry Technical Training Center (LTTC).

Results

The analysis of collected data resulted in both general and specific training recommendations. These recommendations are designed to create the best possible training environment, given realistic constraints in the areas of manpower and resources. The general recommendations are:

1. Consider the common skill and knowledge requirements identified in the task analysis when designing or revising training. Training should emphasize the similarities within and across the AFSC shreds. This approach may help graduates understand the broader applicability of their skills and knowledge.

2. Evaluate the need to increase emphasis on using TOs in resident training. Analysis reveals the ability to apply information contained in TOs is critical to job performance. Since all job requirements are TO driven, successful task accomplishment depends on how well technicians can locate, cross-reference, and apply the information.

3. Consider restructuring the F-111 Avionics Systems initial skills courses to shift emphasis from "performing operational checkouts" to "isolating basic malfunctions" by following procedures in technical data.

4. Consider using career development courses (CDCs) to cover the knowledge requirements that differ among aircraft systems for 5-skill-level upgrade. Because of the experience gained by this point in an airman's career, CDCs can cover system differences.

Specific training recommendations are presented in STS format in Appendix C. They include numerous proposals for content and proficiency code changes, which indicate what to train, where to train, and to what level. For correlation purposes, TRA tasks are cross-referenced with applicable STS items. These specific training recommendations can assist training managers and curriculum developers in revising the STS at the next utilization and training workshop (U&TW).

SPECIALTY OVERVIEW

Background

The 452X3 specialty was created on 1 May 1987 as a result of RWF restructures. Prior to May 1987, the career field was structured as follows:

326X6A - Integrated Avionics Attack Control Systems Specialty
326X7A - Integrated Avionics Instrument and Flight Control Specialty
326X8A - Integrated Avionics Communications, Navigation, and Penetration Aids Specialty

The AFSCs were shredded by aircraft through the 5-skill level and merged at the 7-skill level. For example, F-111 "A shop" 7-skill-level personnel were also responsible for "A shop" duties on the F-15s and F-16s.

After RWF initiatives, the AFSC structure is as follows:

452X3A - Integrated Avionics Attack Control Systems Specialty
452X3B - Integrated Avionics Instrument and Flight Control Specialty
452X3C - Integrated Avionics Communications, Navigation, and Penetration Aids Specialty

The AFSC is still shredded through the 5-skill level, but at the 7-skill level, personnel assume the responsibilities of all shreds on only the F-111.

The RWF restructuring initiatives caused numerous changes in the duties and responsibilities of F-111 Avionics Personnel. Changes in training requirements for resident, CDC, and OJT programs have also occurred.

Mission Description

F-111 Avionics Systems personnel perform a variety of tasks based upon the missions of their major command. They identify and analyze malfunctions; remove, install, align, calibrate, boresight, and operationally check avionics systems at the organizational level; and inspect, service, and perform general-aircraft handling procedures. Finally, they are responsible for maintaining inspectio and maintenance records.

Manning

As of 31 May 1991, the F-111 Avionics Systems specialty had 1,225 personnel authorized and 1,226 assigned. Table 1 contains data on the number authorized versus the number assigned by shred.

TABLE 1
AFSC 452X3 MANNING

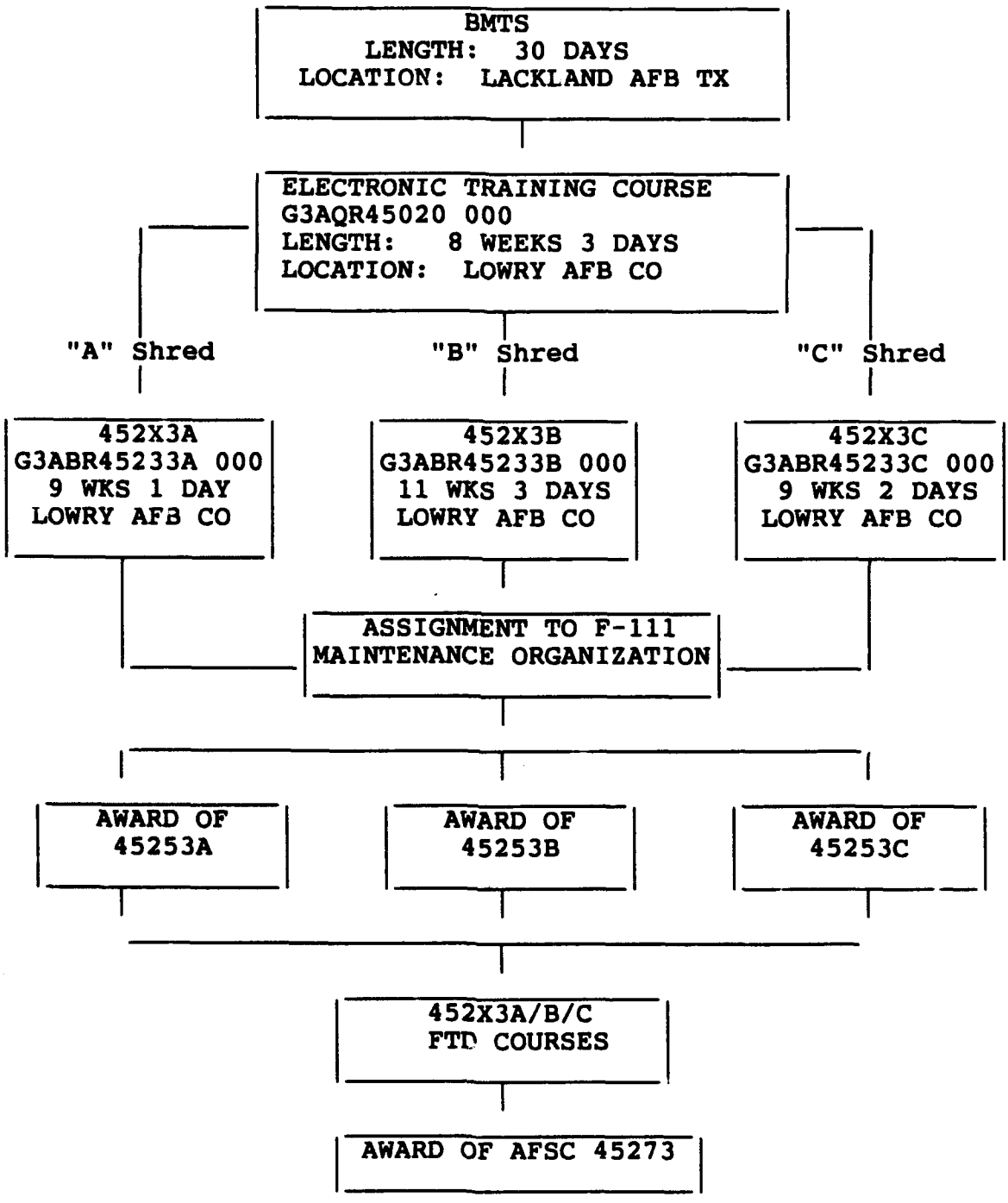
AFSC	45273	452X3A	452X3B	452X3C	TOTAL
AUTHORIZED	265	330	278	352	1,225
ASSIGNED	315	293	289	329	1,226
PERCENTAGE	119%	89%	104%	93%	100%

The manning situation is not stable. According to HQ TAC/LGMF, the cuts projected by RWF restructuring efforts have not yet been made. Part of the agreement under RWF was to make no reductions until completion of the 3-year transition period. Since the transition period was completed in October 1990, manning levels are being reevaluated, and additional cuts are anticipated. It is unknown at this time whether the anticipated cuts will be sufficient to meet overall Air Force manning requirements. Since every unit visited during TRA development felt "undermanned," these future cuts emphasize the need for effective training.

Training Currently Available

Formal courses for AFSC 452X3 are currently offered by the 3450th Technical Training Squadron, Lowry AFB CO, and 3751st Field Training Squadron, Sheppard AFB TX. A complete description of course prerequisites and content can be found in AFR 50-5, USAF Formal Schools.

All enlisted personnel assigned to the F-111 Avionics Systems Specialty must attend the Electronic Training Course after graduation from Basic Military Training School (BMTS). The next step is the appropriate F-111 Avionics Systems Course for award of the 3-skill level AFSC (with shred). Once personnel obtain a 7-skill level, the shred is dropped. Completion of FTD courses is mandatory for award of AFSC 45273. The following illustration describes AFSC 452X3 training from BMTS to the 7-skill level.



Specialty Concerns

This section provides a summary of specialty concerns identified during task analysis. These concerns were consolidated during months of interviews with technicians at all levels. A few of these concerns are also addressed indirectly in the Results section.

1. Loss of expertise. Personnel feel the RWF initiatives are having a negative impact upon morale and job satisfaction. The most common complaint is that technicians are required to work on too many different systems and cannot become proficient on all. Many people expressed a desire for even more specialization than existed before RWF.

2. CDC requirements. The volume of material required for upgrade training is too great. Material in the AFSC 45250 volume seems beyond the scope of current job requirements. Because the CDCs are written primarily for 5-skill-level upgrade, a technician in 7-skill-level upgrade training is forced to repeat a lot of material gained from job experience. In addition, each shredded volume of the CDCs contains duplicated material from other shreds.

3. Electronic Fundamentals. The majority of technicians interviewed felt the amount and depth of electronic fundamentals taught in basic courses and CDCs are not required for job accomplishment. There is a need for electronic fundamentals, but not to the degree currently being provided.

4. Aircraft models. Many technicians feel training should distinguish among the various aircraft models, especially the F-111D. Currently, no training is provided for this model aircraft with the exception of "difference" courses provided by FTDs at local bases.

5. Maintenance Trainers. Several technicians felt the maintenance trainers used to teach aircraft system troubleshooting should be upgraded to allow more flexibility with scenarios.

Advanced Technology Training Delivery (ATTD) Systems

During the initiation of the 452X3 TRA, the TSO asked USAFOMS to analyze the possibility of satisfying training with some form of ATTD such as Interactive Video Disk (IVD) or computer-based training. HQ ATC/TTOA was specifically interested in determining if a job requirement coded "2b" (partially proficient on step-by-step procedures) could be satisfied with media other than face-to-face and hands-on instruction.

Because there is currently no validated training delivery system employing ATTD in ATC for the 45XXX career field, it was not possible to do a systematic analysis. A previous "4-skill-level" study in the 451XX arena showed graduates who used trainers were more proficient upon completion of initial skills training and required less time for 5-skill-level upgrade than the graduates that did not use trainers. In addition, the "Manager's Guide to New Training Technologies," published in August 1989, showed all ATTD systems have greater potential than conventional training for characteristics such as interactivity, standardization of instruction, and fewer instructor requirements. Other benefits of ATTD include greater range of instructional strategies, long-term reduced costs, and increased reliability.

Having looked at several applications of IVD for weapons systems, there is no reason why IVD or another form of ATTD cannot be used to teach certain job requirements. Good job candidates to use for implementing an ATTD system are the troubleshooting tasks, because the branching or logic process used during troubleshooting is well suited to ATTD systems.

A major problem facing resident training is the inability to insert malfunctions in equipment, because this practice often involves "breaking" operational equipment. This restriction makes the use of operational equipment to teach troubleshooting virtually impossible. ATTD systems can fill the gap. It can give graduates an increased understanding of troubleshooting logic and better prepare them to tackle troubleshooting situations in an OJT environment. Although using this approach is not the same as troubleshooting on an actual aircraft, the multitude of scenarios and level of difficulty that can be achieved far exceed the current training capabilities.

Future Plans

With Cannon AFB, NM soon to be the only F-111 base, several proposals have been presented to manage this career field. The first is to distribute personnel overages to all integrated avionics AFSCs. This would create overages in all related AFSCs, as opposed to just the F-111 community; however, there would be no overseas rotation index for the people assigned to Cannon. The second proposal is to create a generic 45XXX AFSC. Personnel would be trained on generic integrated systems and assigned as needed. Assignment rotation would be among all integrated avionics aircraft. The third proposal is to tie the F-111 and F-15E aircraft together. This would provide an overseas rotation index for F-111 personnel and relieve the F-15E training burden from the F-15 community.

In October 1991, Phase II FTD training was consolidated with Phase I training at Lowry AFB. In addition to this major change, technological innovations, such as updates and modifications, are constantly occurring, but the job requirements of AFSC 452X3 are not impacted. The only program expected to impact this specialty involves the implementation of Deployed Aircraft Repair Techniques (DART). Under DART, a technician will be responsible for certain aspects of line replaceable unit (LRU) repair when avionics intermediate repair is not available. The amount and extent of repair to be accomplished are uncertain at this time. With an increase in job requirements, the amount of electronic fundamentals required may increase. Additional testers such as high mobility test sets (HIMOTS) may become a requirement for flightline LRU repair, but the exact requirements and possible configurations are unknown at this time. These increasing demands on job performance will require innovation and flexibility in all areas of training design and delivery.

TRA DEVELOPMENT PROCEDURES

Planning

Training analysts from 3400 TSS/OMS formed the project team for this TRA. Work began with a thorough review of the specialty documentation, including duties in AFR 39-1, the existing STS, course descriptions in AFR 50-5, resident course documents, and CDCs. The analysts interviewed functional managers, shop chiefs, and course management personnel for help in determining bases to visit and existing training issues. This information gave the team a solid foundation for planning the project.

TRA Task List Development

Analysis of any specialty starts with a task list which describes each separate work function performed by technicians in the career ladder. The February 1989 452X3 USAF Job Inventory (JI) was used as the starting point for development of the TRA Task List. Supervisory, additional duty, and nonspecialty-specific tasks were removed, and the remaining JI statements were clustered into TRA tasks to be analyzed. During interviews with SMEs, many of these tasks were deleted or revised, and several tasks were added to better define duties performed. This process resulted in 228 TRA tasks; 66 for the "A" shred, 92 for the "B" shred, 64 for the "C" shred, and 6 tasks common to all shreds.

Data Collection

Interviews were conducted with well-qualified SMEs selected by branch and shop chiefs at Cannon, Mt. Home, and Plattsburg AFBs and LTTC. The interviews matched qualified personnel with the tasks identified for analysis. The support provided by MAJCOM representatives was essential to the success of task analysis.

The task-level information provided by SMEs formed the basis of the descriptive TRA data base. SME interviews continued until project analysts received consistently duplicate information. Although the number of SMEs needed to analyze a task varied, careful SME selection for interview, followed by validation with SMEs assigned to different MAJCOMs and weapons systems, helped assure a thorough, reliable data base.

The data were recorded on task analysis worksheets (TAWs). The following is an explanation of the TAW headings.

TASK NUMBER: TRA task number.

TASK STATEMENT: The task to be performed.

TASK NOTES: Contains brief comments or explanations to enhance understanding of the task statement.

EQUIPMENT, TOOLS, SUPPLIES: Equipment, tools, supplies, etc., required to perform the task.

REFERENCES: Lists the TOs, AFOSH Standards, Regulations, and any other references required to perform the task.

CONDITIONS: Environment in which a task is performed. Includes consideration of the actual physical environment. A condition for all tasks is "On the flightline." If no condition is listed, it is understood that this is the only condition for that task.

CUES: Actions or directives that initiate, signal, or prompt the performance of the task.

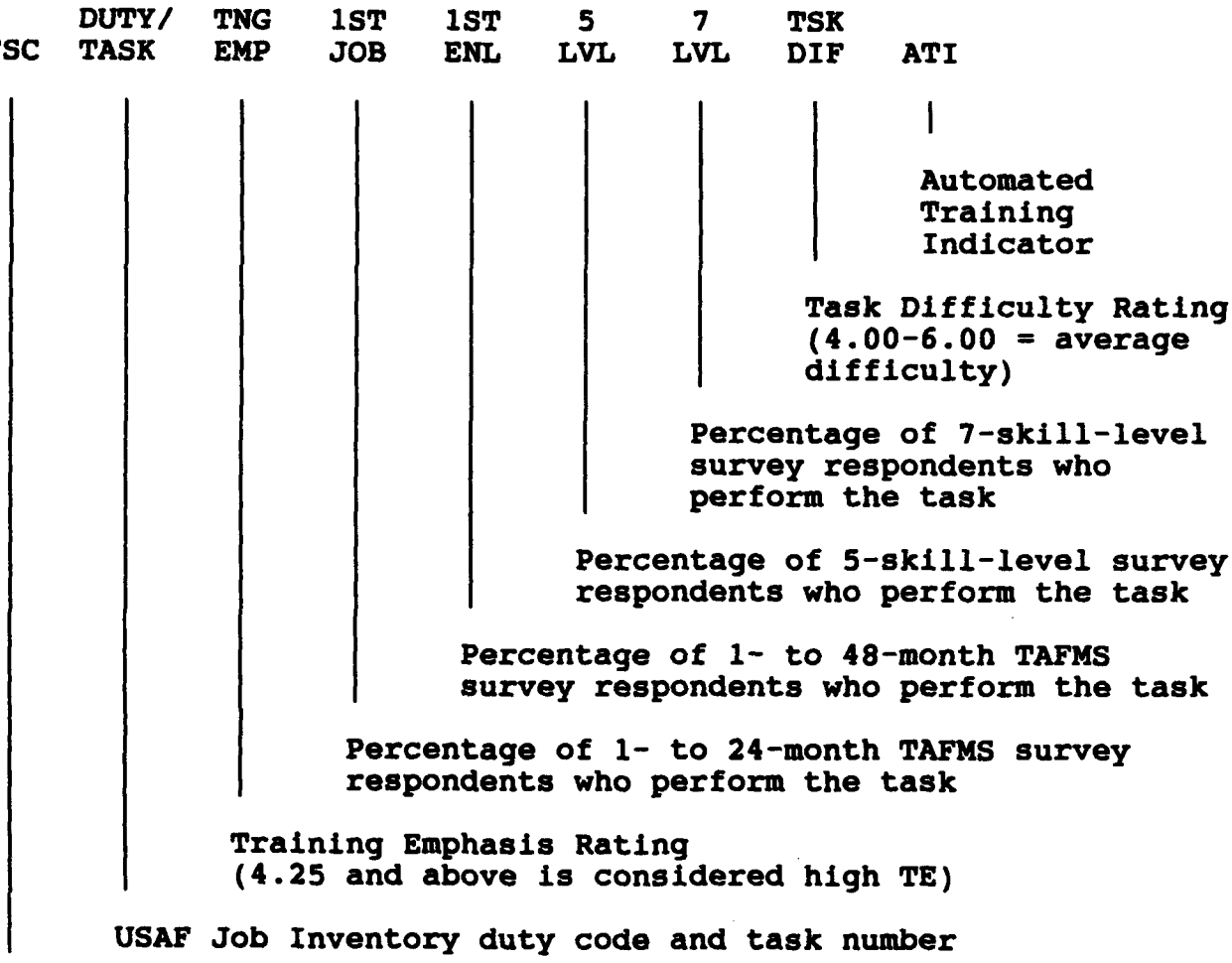
STANDARDS: Specifies the job performance evaluation standards for performing the task accurately and expediently.

ACTIVITIES: Significant steps required to perform the task.

SKILLS: Skills involve physical or manipulative activities, often requiring knowledge and special requirements for speed, accuracy, or coordination for task execution.

KNOWLEDGE: Knowledge, not directly observable, involves the use of mental processes enabling recall of facts, identification of concepts, application of rules or principles, solving of problems, or creative thinking, etc.

RELATED OCCUPATIONAL SURVEY DATA: Occupational survey data are used with the Training Decisions Logic Table (ATCR 52-22, Occupational Analysis Program, Attachment 1) to determine where tasks should be trained and to what level. The following explains the data columns listed within this report.



USAF JOB INVENTORY TASK STATEMENTS: A listing of job inventory statements applicable to the task. Some job inventory tasks are related to TRA tasks, but they cannot be classified as activity, skill, or knowledge behaviors. These are normally equipment-specific statements and are included because they will provide additional information about the task.

RESULTS

This section consists of common skills and knowledge, general recommendations for specialty training, and specific training content recommendations. The recommendations are designed to create the best possible training environment, given realistic constraints in the areas of manpower and resources. The priority and feasibility for implementation of the recommendations will be determined by Air Staff, MAJCOM, and the F-111 Avionics Systems School personnel.

Common Skills and Knowledge

Once the task data were collected from SMEs, they were analyzed by USAFOMS training analysts. Skills and knowledge required to perform each of the tasks were identified. A complete listing of these skill and knowledge requirements is presented in Volume II of this TRA in the form of task analysis worksheets.

After identification of the skills and knowledge required to perform each task was completed, training analysts then compared the requirements across the AFSC shreds. This comparison showed the number of times a skill or knowledge was required for each shred (see Appendix A).

All skill and knowledge requirements were then grouped into five categories: 1) those which apply to all functions; 2) those which apply to performing operational checkouts; 3) those which apply to isolating malfunctions; 4) those which apply to repair of systems; and 5) those which apply to maintaining systems. From this list, the common skill and knowledge requirements were identified. For an item to have been considered common, it had to appear in 10 percent or more of the tasks within one of the five major areas. Appendix B lists all the common skill and knowledge requirements identified in this manner.

General Training Recommendations

1. Consider the common skill and knowledge requirements identified in the task analysis when designing or revising training.

Training should enable personnel to transfer what they know about one piece of equipment to the next. Analysis results indicate areas of commonality in the skill and knowledge requirements within and across the AFSC shreds. Training could emphasize these commonalities by teaching technicians how to perform operational checkouts, troubleshoot malfunctions, and make repairs independent of specific systems. Although training must be conducted using specific systems, it should be approached in a manner that points out the broader applicability of their skills and knowledge.

2. Evaluate the need to increase emphasis on using TOs in resident training.

Analysis shows that the ability to apply TO information is critical to job performance. Since all job requirements are TO driven, successful completion depends upon how well a technician can locate, cross-reference, and apply the information. Although the types of TOs and their uses are covered in current courses, analysis has shown that graduates could benefit substantially from an increase in "hands-on" TO usage. This will not be an easy job, since this will require increased course time and larger TO libraries. Suggestions for improving the "hands-on" time include having students find the actual TOs they will need, making students research TOs to solve problems, and eliminating the use of extracts. No matter how TO usage is approached, this knowledge should be reinforced throughout the course.

3. Consider restructuring the F-111 Avionics Systems courses to shift training emphasis from "performing operational checkouts" to "isolating basic malfunctions."

Although aircraft systems may differ in their function and operational characteristics, analysis results have proven that the steps a technician must take to operationally test a system are virtually the same. The systems and test equipment involved may vary, but the same skills and knowledge are required for each one. Operational checkout is considered by technicians to be the "easy" task of this specialty, and training time could be reduced considerably. The more difficult task is troubleshooting. The ability to determine the cause of a malfunction is the most valuable skill technicians need to master. Troubleshooting, however, has distinct levels. One level involves following the procedures outlined in technical data to find the problem or at least narrow it to several alternatives. A more difficult level is encountered when the technical data incorrectly identify or fail to identify the cause of the problem. At this point, technicians must be extremely skilled in troubleshooting techniques to isolate the problem. Although these in-depth procedures should not be taught to 3-skill-level personnel, there is a definite need to teach basic troubleshooting to apprentices. They need experience in finding malfunctions through automated testing. They also need to understand why the TO procedures are not always effective. The earlier personnel learn the essential logic of troubleshooting, the more productive they are going to be. Going beyond this understanding and actually finding the cause of the malfunction should be reserved for advanced skill levels. The more sophisticated application of troubleshooting requires a greater experience base than an apprentice can be expected to achieve.

4. Consider using CDCs to cover the knowledge requirements that differ among aircraft systems for 5-skill-level upgrade.

Because of the experience being gained during upgrade training to the 5-skill level, CDCs can cover the material, such as theory of operation and differences in characteristics among various aircraft

systems. Teaching this detailed knowledge in an initial skills course is unnecessary, since it will not be required until advanced skill levels. The areas recommended for inclusion are annotated as specific training recommendations in the CDC column of the STS.

Specific Training Recommendations

Specific training recommendations are provided in the form of recommended STS changes (Appendix C). These recommended changes are based primarily on the task analysis data, guidelines set forth in AFR 8-13, Air Force Specialty Training Standards and Air Force Job Qualification Standards, and ATCR 52-22, Occupational Analysis Program.

APPENDIX A
COMPARISON OF SKILL AND KNOWLEDGE REQUIREMENTS

Listed below are all the skill and knowledge requirements for all shreds. The numbers shown under each column are the number of times that skill or knowledge appeared in the task analysis for that shred.

A	B	C		SKILLS
1	-	-	S	ADJUST SYNCHROS
-	1	-	S	ALIGN DOWEL PINS
-	-	1	S	APPLY ELECTRICALLY CONDUCTIVE ADHESIVE
47	8	20	S	APPLY EXTERNAL COOLING AIR TO THE AIRCRAFT
48	45	36	S	APPLY EXTERNAL ELECTRICAL POWER TO THE AIRCRAFT
1	18	-	S	APPLY EXTERNAL HYDRAULIC POWER TO THE AIRCRAFT
-	1	-	S	APPLY GREASE
-	-	2	S	APPLY HIGH PRESSURE AIR USING C-10 AIR CONDITIONER
-	1	-	S	APPLY PAINT OR STICKERS TO INDICATOR
16	24	16	S	ASSEMBLE SOLDERLESS COAXIAL CONNECTORS
16	24	16	S	ASSEMBLE SOLDERLESS CRIMP CONNECTORS
16	24	16	S	ASSEMBLE SOLDERLESS MULTIPIN CONNECTORS
1	-	-	S	CHECK CIRCUIT BREAKERS FOR DEFECTS
1	-	-	S	CHECK GROUNDING RINGS FOR CORROSION AND SECURITY
1	1	1	S	CONNECT HIGH PRESSURE HOSE
1	-	-	S	ENSURE FASTENERS ARE MADE OF NON-MAGNETIC MATERIAL
1	-	-	S	ENTER DATA INTO DCC
1	-	-	S	ENTER DATA INTO NCU
1	1	1	S	INSTALL AIR CONDITIONER INTERCONNECT ADAPTER
17	24	17	S	INSPECT AIRCRAFT WIRING
1	-	-	S	INSPECT DEHUMIDIFIER
15	2	10	S	INSPECT LRUS
-	1	-	S	INSPECT PITOT TUBE FOR NICKS AND DENTS
1	-	-	S	INSPECT SYSTEM
-	-	2	S	INSTALL LOUVER COVERS
-	1	-	S	ISOLATE MACH PROBE HEATER MALFUNCTION
15	21	16	S	ISOLATE MALFUNCTIONS WITHIN AIRCRAFT WIRING
-	1	-	S	ISOLATE PNEUMATIC BLOCKAGES
-	1	-	S	ISOLATE PNEUMATIC FAULTS
6	-	-	S	OPERATE AFRS
3	2	-	S	OPERATE ARS
6	1	1	S	OPERATE CADC
5	-	-	S	OPERATE DCC
3	-	-	S	OPERATE FDC
2	-	-	S	OPERATE FLIGHT CONTROL COMPUTER
3	-	-	S	OPERATE FLIGHTLINE COMPUTER LOADER
2	-	-	S	OPERATE IDS
6	-	-	S	OPERATE INS
3	-	-	S	OPERATE LARA/CARA
16	24	20	S	OPERATE LOW PRESSURE AIR COMPRESSOR
4	-	3	S	OPERATE MJ-4
2	-	-	S	OPERATE TFR
1	-	-	S	OPERATE VIRTUAL IMAGE DISPLAY

A	B	C		SKILLS
1	-	-	S	OPERATE WEAPON CONTROL PANEL
62	73	58	S	PERFORM AIRCRAFT SAFE FOR MAINTENANCE CHECKS
-	1	-	S	PERFORM COMPASS SWING
1	-	-	S	PERFORM PIN RESISTANCE CHECK
-	7	-	S	PERFORM SAFETY WIRING
1	-	-	S	PERFORM VOLTAGE CROSSFEED CHECK
-	-	3	S	POSITION PALLET STRUTS
3	-	-	S	POSITION RADAR ABSORBENT BLANKET
6	2	3	S	POSITION RADIATION CONES
-	-	2	S	POSITION RADOME STOW BAR
-	-	3	S	POSITION SIDEDOOR STRUTS
-	-	1	S	POSITION STAB LOCKS
-	-	1	S	REKEY KY-58
1	-	-	S	REMOVE OR INSTALL MCC SYSTEM LRUS
-	-	4	S	SEAL OR RESEAL ANTENNAS
16	24	16	S	SOLDER OR DESOLDER MULTIPIN CONNECTORS
16	24	16	S	SOLDER OR DESOLDER TERMINAL CONNECTIONS
1	-	-	S	UPLOAD/DOWNLOAD POD
-	1	-	S	USE AFRS TEST SET
-	-	2	S	USE AIR PRESSURE GAUGE
-	-	1	S	USE AIR PUMP
18	29	22	S	USE AIRCRAFT INTERCOM SYSTEM
1	-	-	S	USE AIRCRAFT JACKS
-	-	1	S	USE AN/ALM-118 TEST SET
1	-	-	S	USE ANTENNA HANDLING FIXTURE
1	-	-	S	USE ANTENNA HAT TESTER
-	1	-	S	USE AOA PROBE TORQUE TESTER
-	2	-	S	USE AOA/SIDESLIP TRANSMITTER TEST SET
1	-	-	S	USE APPLICABLE WEAPONS RELEASE SYSTEM
-	2	-	S	USE ASDR TEST SET
5	4	-	S	USE BORESIGHT KIT
2	-	1	S	USE BREAKOUT BOX
-	-	3	S	USE CHAFF CATCHER/PLATEN SAFETY PIN
-	-	1	S	USE CLEANING SUPPLIES
62	71	59	S	USE COMMON HANDTOOLS
1	1	-	S	USE COMPASS CALIBRATOR
-	2	-	S	USE CONRAC TRANSMITTER SIMULATOR
4	-	-	S	USE CRADLE ADAPTER
1	-	-	S	USE DELAY LINE
-	1	-	S	USE DIGITAL LOGIC PROBE
-	-	2	S	USE DISPENSER SET SIMULATOR
1	-	-	S	USE DOPPLER RADAR SET ADAPTER
1	-	3	S	USE ECM POD CRADLE
-	-	2	S	USE ECM POD TRAILER
16	24	16	S	USE ELECTRICAL CONNECTOR TOOL KIT
-	-	2	S	USE ELECTRONIC EQUIPMENT LIFT TRAILER
-	-	3	S	USE FIN POD STAND
-	5	-	S	USE FITTING KIT
-	2	-	S	USE FUEL QUANTITY ADAPTER KIT
-	4	-	S	USE FUEL QUANTITY TESTER
-	-	2	S	USE GHRP BOX
1	-	-	S	USE HEAD CLEANING TAPE
-	-	2	S	USE HEADSET

A	B	C		SKILLS
16	24	16	S	USE HEAT GUN
-	2	-	S	USE ICNIS
-	-	4	S	USE IFF TRANSPONDER TEST SET
-	-	2	S	USE ILS TEST SET
-	-	2	S	USE IMPROVED RADAR SIMULATOR
-	2	-	S	USE INDICATOR POWER INPUT CABLE
-	-	1	S	USE INTERPHONE CORD TEST SET
-	-	4	S	USE KIK
-	-	2	S	USE KIR
-	-	2	S	USE KYK-13
-	3	-	S	USE LEAK DETECTOR
3	-	-	S	USE LMU OR CARA BOX
5	10	17	S	USE MAINTENANCE STAND
1	-	-	S	USE MCC
1	-	-	S	USE MFDS
-	-	3	S	USE MIDAS TESTER
-	-	1	S	USE MILLIOHMMETER (SHALLCROSS)
8	-	3	S	USE MISSION DATA LOADER
18	22	18	S	USE MULTIMETER
16	24	20	S	USE NF-2
3	1	1	S	USE NITROGEN CART
1	-	-	S	USE OFP MAGNETIC TAPE CARTRIDGE
4	-	4	S	USE OSCILLOSCOPE
-	9	-	S	USE PITOT TUBE ADAPTER
-	1	-	S	USE PITOT TUBE REMOVER
-	1	-	S	USE PLATFORM KIT
-	-	2	S	USE RADAR TRANSPONDER TEST SET
-	1	-	S	USE RADOME CRADLE
16	21	17	S	USE REFLECTOMETER
-	-	1	S	USE RF TESTER
-	1	1	S	USE SHORTING PLUG
16	24	16	S	USE SOLDERING KIT
-	2	-	S	USE SPANNER WRENCH
-	-	1	S	USE SPECTRUM ANALYZER
-	2	-	S	USE SPIKE CONE ANGLE INDICATOR
-	2	-	S	USE SPIKE PROBE ADAPTER
-	-	1	S	USE STAB-LOCK
7	3	-	S	USE SUBSYSTEM TIE-IN TEST SET
-	1	-	S	USE SWAPOVER CABLE
-	-	2	S	USE TACAN TEST SET
3	-	-	S	USE TFRS TEST SET
16	24	16	S	USE THERMAL STRIPPERS
-	-	4	S	USE THRU-LINE WATT METER
9	15	11	S	USE TORQUE WRENCH
-	-	2	S	USE TRANSMISSION LINE TESTER
5	-	-	S	USE TSLVC
-	13	-	S	USE TTU-205 TESTER
2	3	1	S	USE ULTRASONIC LEAK DETECTOR
2	-	-	S	USE VIDEO MONITOR
2	-	-	S	USE VIDEO TAPE PLAYER
3	-	1	S	USE WAVEGUIDE PRESSURE TESTER
-	2	-	S	USE 28VDC POWER SOURCE
-	2	-	S	USE 28VDC SUPPLY AGE ADAPTER
-	2	-	S	USE 9VDC TRANSISTOR BATTERY

A	B	C		KNOWLEDGE
-	2	-	K	ANNOTATE PROBE ANGLE PRIOR TO REMOVAL
-	1	-	K	ANNOTATE COMPASS SWING DATA SHEET
8	16	4	K	APPLY AC CIRCUIT THEORY OF OPERATION
-	1	-	K	APPLY AC GENERATOR THEORY OF OPERATION
-	3	-	K	APPLY AC MOTOR THEORY OF OPERATION
-	1	1	K	APPLY AM RECEIVER THEORY OF OPERATION
3	-	-	K	APPLY ANTENNA THEORY OF OPERATION
1	-	-	K	APPLY ARS SYSTEM THEORY OF OPERATION
-	1	-	K	APPLY BIPOLAR JUNCTION TRANSISTOR THEORY OF OPERATION
-	1	-	K	APPLY CAPACITOR THEORY OF OPERATION
1	-	-	K	APPLY CATHODE RAY TUBE (CRT) THEORY OF OPERATION
-	2	1	K	APPLY COMPUTER THEORY OF OPERATION
1	-	-	K	APPLY DATA LINK THEORY OF OPERATION
9	15	5	K	APPLY DC CIRCUIT THEORY OF OPERATION
-	1	-	K	APPLY DC GENERATOR THEORY OF OPERATION
-	2	-	K	APPLY DC MOTOR THEORY OF OPERATION
1	-	-	K	APPLY DCC THEORY OF OPERATION
1	1	-	K	APPLY ESD PRECAUTIONS
16	24	16	K	APPLY FLIGHTLINE SAFETY PROCEDURES
2	-	1	K	APPLY FM RECEIVER THEORY OF OPERATION
2	-	-	K	APPLY FM TRANSMITTER THEORY OF OPERATION
-	1	-	K	APPLY FREQUENCY SENSITIVE FILTER THEORY OF OPERATION
-	1	-	K	APPLY GYRO THEORY OF OPERATION
-	-	1	K	APPLY LED THEORY OF OPERATION
-	1	-	K	APPLY LIMITER CIRCUIT DIODE THEORY OF OPERATIONS
-	1	-	K	APPLY LIMITER CIRCUIT TRANSISTOR THEORY OF OPERATION
-	1	-	K	APPLY LIMITER CIRCUIT ZENER DIODE THEORY OF OPERATION
1	-	-	K	APPLY LOCAL MISSION REQUIREMENTS
3	2	-	K	APPLY MAIN LOGIC GATE THEORY OF OPERATION
1	-	-	K	APPLY MICROWAVE OSCILLATOR OR AMP THEORY OF OPERATION
-	2	-	K	APPLY OPERATIONAL AMPLIFIER THEORY OF OPERATION
14	24	16	K	APPLY OPSEC, COMSEC, AND PHYSICAL SECURITY PRECAUTIONS
2	-	-	K	APPLY OSCILLATOR CIRCUIT THEORY OF OPERATION
-	1	-	K	APPLY PNEUMATIC FLOW CHART
1	2	-	K	APPLY POWER SUPPLY THEORY OF OPERATION
2	-	1	K	APPLY PULSE MODULATION RECEIVER THEORY OF OPERATION
2	-	-	K	APPLY PULSE MODULATION TRANSMITTER THEORY OF OPERATION
-	2	-	K	APPLY RCL CIRCUIT THEORY OF BASIC OPERATION
8	11	3	K	APPLY RELAY THEORY OF OPERATION
-	-	1	K	APPLY RESISTOR THEORY OF OPERATION
1	-	-	K	APPLY RESONANT CAVITY THEORY OF OPERATION
-	1	1	K	APPLY SOLENOID THEORY OF OPERATION
5	5	1	K	APPLY SOLID STATE DIODE THEORY OF OPERATION
10	4	1	K	APPLY SYNCHRO-SERVO THEORY OF OPERATION
1	-	1	K	APPLY SYSTEM INTEGRATION THEORY OF OPERATION
27	29	18	K	APPLY SYSTEM THEORY OF OPERATION

A	B	C		KNOWLEDGE
66	92	64	K	APPLY TECHNICAL DATA
-	3	-	K	APPLY THREE-PHASE TRANSFORMER THEORY OF OPERATION
-	3	-	K	APPLY TRANSDUCER THEORY OF OPERATION
-	3	-	K	APPLY TRANSFORMER THEORY OF OPERATION
-	-	2	K	APPLY TRANSMISSION LINE THEORY OF OPERATION
2	-	1	K	APPLY WAVEGUIDE THEORY OF OPERATION
1	-	-	K	CONVERT VOLTAGES INTO ALTITUDE DISPLAYS
1	-	-	K	IDENTIFY CORRECT OFP
1	-	-	K	IDENTIFY LOCAL COORDINATES
1	-	-	K	IDENTIFY LOCAL MISSION LOAD REQUIREMENT
2	-	-	K	IDENTIFY LOCAL OFP REQUIREMENTS
3	-	-	K	INTERPRET DCC OCTAL READOUT
2	-	-	K	INTERPRET IDS DISPLAYS
1	-	-	K	INTERPRET ARS ANTENNA SCAN
1	-	-	K	INTERPRET ARS RF RETURNS
-	-	1	K	INTERPRET BOOLEAN EQUATIONS
-	1	-	K	INTERPRET PNEUMATIC FLOW CHART
-	1	-	K	INTERPRET SURFACE MOVEMENTS
-	-	1	K	INTERPRET TRUTH TABLES
-	1	-	K	ISOLATE FAULTY AC GENERATORS
-	4	-	K	ISOLATE FAULTY AC MOTORS
1	1	1	K	ISOLATE FAULTY ANTENNAS
-	1	-	K	ISOLATE FAULTY CAPACITORS
-	1	-	K	ISOLATE FAULTY DC GENERATORS
-	2	-	K	ISOLATE FAULTY DC MOTORS
-	1	-	K	ISOLATE FAULTY OPERATIONAL AMPLIFIERS
1	-	-	K	ISOLATE FAULTY POWER SUPPLIES
-	2	-	K	ISOLATE FAULTY RCL CIRCUITS
8	11	2	K	ISOLATE FAULTY RELAYS
1	2	-	K	ISOLATE FAULTY SOLID STATE DIODES
-	9	-	K	ISOLATE FAULTY SYNCHROS-SERVOS
-	3	-	K	ISOLATE FAULTY THREE-PHASE TRANSFORMERS
-	2	-	K	ISOLATE FAULTY TRANSDUCERS
-	1	-	K	ISOLATE FAULTY TRANSFORMERS
-	-	2	K	ISOLATE FAULTY TRANSMISSION LINES
2	-	1	K	ISOLATE FAULTY WAVEGUIDES
3	3	1	K	PERFORM BINARY CONVERSIONS
-	-	1	K	PERFORM HEXADECIMAL CONVERSIONS
3	-	1	K	PERFORM OCTAL CONVERSIONS
4	-	-	K	PERFORM OCTAL MATH OPERATION
-	1	-	K	PREPARE MESSAGES
1	-	-	K	SERIAL INFORMATION
-	1	-	K	TRACE PNEUMATIC DIAGRAMS
18	3	16	K	TRACE SCHEMATIC DIAGRAMS
2	15	2	K	TROUBLESHOOT AC CIRCUITS
-	1	-	K	TROUBLESHOOT AC MOTORS
1	-	2	K	TROUBLESHOOT ANTENNAS
3	14	3	K	TROUBLESHOOT DC CIRCUITS
-	1	-	K	TROUBLESHOOT DC MOTORS
-	1	-	K	TROUBLESHOOT OPERATIONAL AMPLIFIERS
-	2	-	K	TROUBLESHOOT RCL CIRCUITS
6	2	1	K	TROUBLESHOOT RELAYS
1	-	-	K	TROUBLESHOOT RESONANT CAVITIES
1	2	-	K	TROUBLESHOOT SYNCHROS-SERVOS

APPENDIX B
COMMON SKILL AND KNOWLEDGE REQUIREMENTS

All of the following skill and knowledge requirements are grouped into one of the five major areas and meet the established cutoff for commonality of 10 percent. The actual number of times the requirement was listed is the total of all shreds. These numbers correspond with the totals in Appendix A.

KNOWLEDGE APPLICABLE TO ALL TASKS	# OF TIMES
K APPLY TECHNICAL DATA	222
K APPLY SYSTEM THEORY OF OPERATION	74

KNOWLEDGE FOR ISOLATING MALFUNCTIONS	# OF TIMES
K TRACE SCHEMATIC DIAGRAMS	37
K APPLY DC CIRCUIT THEORY OF OPERATION	29
K APPLY AC CIRCUIT THEORY OF OPERATION	28
K APPLY RELAY THEORY OF OPERATION	22
K ISOLATE FAULTY RELAYS	21
K TROUBLESHOOT DC CIRCUITS	20
K TROUBLESHOOT AC CIRCUITS	19
K APPLY SYNCHRO-SERVO THEORY OF OPERATION	15
K APPLY SOLID STATE DIODE THEORY OF OPERATION	11
K ISOLATE FAULTY SYNCHROS-SERVOS	9
K TROUBLESHOOT RELAYS	9
K PERFORM BINARY CONVERSIONS	7

KNOWLEDGE FOR MAINTAINING SYSTEMS	# OF TIMES
K APPLY FLIGHTLINE SAFETY PROCEDURES	56
K APPLY OPSEC, COMSEC, AND PHYSICAL SECURITY PRECAUTIONS	54

SKILLS APPLICABLE TO ALL TASKS	# OF TIMES
S PERFORM AIRCRAFT SAFE FOR MAINTENANCE CHECKS	193
S USE COMMON HANDTOOLS	192
S APPLY EXTERNAL ELECTRICAL POWER TO THE AIRCRAFT	129
S APPLY EXTERNAL COOLING AIR TO THE AIRCRAFT	75
S USE AIRCRAFT INTERCOM SYSTEM	69
S USE NF-2	60
S OPERATE LOW PRESSURE AIR COMPRESSOR	60
S USE MULTIMETER	58
S INSPECT AIRCRAFT WIRING	58
S USE MAINTENANCE STAND	32

SKILLS FOR ISOLATING MALFUNCTIONS	# OF TIMES
S USE REFLECTOMETER	54
S ISOLATE MALFUNCTIONS WITHIN AIRCRAFT WIRING	52
S INSPECT LRUS	27
S USE OSCILLOSCOPE	8
S USE ULTRASONIC LEAK DETECTOR	6

SKILLS FOR REPAIR	# OF TIMES
S USE HEAT GUN	56
S USE ELECTRICAL CONNECTOR TOOL KIT	56
S SOLDER OR DESOLDER TERMINAL CONNECTIONS	56
S SOLDER OR DESOLDER MULTIPIN CONNECTORS	56
S ASSEMBLE SOLDERLESS MULTIPIN CONNECTORS	56
S ASSEMBLE SOLDERLESS CRIMP CONNECTORS	56
S ASSEMBLE SOLDERLESS COAXIAL CONNECTORS	56
S USE THERMAL STRIPPERS	56
S USE SOLDERING KIT	56
S USE TORQUE WRENCH	35
S PERFORM SAFETY WIRING	7
S OPERATE MJ-4	7

APPENDIX C
SPECIFIC TRAINING RECOMMENDATIONS

Many of the recommended changes are proficiency code changes. There are three major reasons these codes were changed. The first reason deals with current guidance provided in AFR 8-13, Air Force Specialty Training Standards and Air Force Job Qualification Standards. AFR 8-13 states that a CDC requirement can exist only when there is an upgrade requirement (e.g., from "A" to "B" or a "2b" to "B") or a need to review material to support an upgrade requirement. As a result, many CDC requirements were changed or eliminated entirely. Several STS elements were also changed to align with recommended entries outlined in the same regulation. All changes made as a result of guidance in AFR 8-13 are marked by a single asterisk (*).

The second major reason for proficiency code changes results from the need to reflect STS elements that do not depend on psychomotor skills as subject knowledge. This means that numerous items previously coded as tasks (2b) or task knowledge (b) have been changed to subject knowledge (B). Also, elements that fall into this category, but were previously dashed (-), have been coded as subject knowledge. Many of these items may have performance skills inherent in their accomplishment, but the final result is concerned strictly with cognitive application. The completed analysis supports coding these items as subject knowledge. Such changes in the specific recommendations are identified with double asterisks (**).

The last major reason the proficiency codes were changed is the need to code representative systems. Proficiency codes may have been added or deleted to allow the recommended representative system to be identified. These changes are marked with triple asterisks (***). This code is also used to show the inclusion of "theory of operation" in the CDC.

Additional changes to the STS are recommended for standardization. These include rewording elements and reformatting paragraphs to make them standard throughout the STS. These changes are identified with triple dollar signs ($$$).

All remaining changes are identified using triple plus signs (+++). The specific reasons for each of these changes are explained in the Summary of Proposed Changes which follows the specific training recommendations.

The format for the specific recommendations is based on the current STS, but only the recommended changes are included. Because recommendations have been made for the 3-skill-level course and a 5-skill-level CDC only, the other columns usually seen in an STS have been deleted. A column has been added to cross-reference STS elements with TRA tasks. For ease of understanding, only the coded STS elements have been referenced to specific TRA task(s). Several TRA TASK references are too lengthy to include in the body of the STS and are provided as notes following the STS.

These recommendations were developed with assistance from the 3450th Technical Training Squadron.

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
* 3.	AF OCCUPATIONAL SAFETY AND HEALTH (AFOSH) PROGRAM			
	a. Hazards of AFSC 452XX	All	B	-
	b. AFOSH standards for AFSC 452XX	All	A	-
	c. Keep work area clean and safe	All	2b	-
	d. Hazards of RF energy		B	-
	f. Use safety practices when working with or in the vicinity of:	All		
	(1) Compressed gases		2b	-
	(2) RF sources		2b	-
	(3) Electrical power		2b	-
	(4) Hydraulic power		2b	-
	(5) Hazardous liquids		2b	-
	(6) Portable fire extinguishers		2b	-
	(7) High intensity sound		2b	-
4.	TECHNICAL PUBLICATIONS	All		
*	a. Function and application		B	-
**	b. Use technical order indexes		B	-
**	c. Use technical orders to perform			
	(1) Maintenance		B	-
	(2) Inspections		-	-
+++	d. TO deficiency reporting		-	B

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
5.	SUPPLY DISCIPLINE			
* a.	Property responsibility	All	-	B
** c.	Use condition tags	Note 1	A	-
* 8.	MAINTENANCE MANAGEMENT			
a.	Responsibilities of the Deputy Commander for Maintenance (DCM)	None	A	B
b.	Basic Functions within Maintenance Complex	None	A	B
c.	Core Automated Maintenance System (CAMS)	All	A	B
d.	Processing and controlling material		-	-
e.	Management of training		-	-
* 9.	MAINTENANCE AND INSPECTION SYSTEMS			
a.	Maintenance Systems	None	A	B
b.	Inspection systems	None	A	B
** c.	Use CAMS	All	B	-
d.	Materiel Deficiency Reporting System	Note 1	-	B
e.	Complete deficiency reports		-	-
** f.	Use aircraft maintenance forms	All	B	-
***10.	GENERAL AIRCRAFT TASKS			
a.	Aircraft General			
(3)	Aircraft Communication equipment			
(a)	Operate radio	31830 31840 32190 32200	2b	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
10.	GENERAL AIRCRAFT TASKS (continued)			
	(b) Use interphone	Note 2	2b	-
	e. Pneudraulic systems			
	(1) Hydraulic systems	Note 3		
	(a) Service		2b	-
	(b) Inspect		2b	-
	j. Aircraft support equipment			
	(5) Air compressors	Note 4		
	(a) Perform pre-use inspection		2b	-
	(b) Use		2b	-
	(8) Portable lighting equipment	Note 5		
	(a) Perform pre-use inspection		2b	-
	(b) Use		2b	-
	(13) Nitrogen servicing equipment	Note 6		
	(a) Perform pre-use inspection		2b	-
	(b) Use		2b	-
13.	FUNDAMENTALS OF AVIONICS SYSTEMS MAINTENANCE			
*	a. Aircraft familiarization	All		
	(1) Major structural areas		-	B
	(2) Major systems		-	B
	(3) Danger areas		A	B
+++	c. Use common handtools	Note 7	2b	-
*	d. Corrosion control	Note 1	-	B

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
+++14.	AIRCRAFT WIRE, CABLE, AND TRANSMISSION LINE MAINTENANCE			
	a. Aircraft wiring/connectors			
	(1) Troubleshoot	Note 8	2b	-
	(2) Repair	Note 9	2b	-
	(3) Inspect	Note 10	B	-
	b. RF cables/connectors			
	(1) Troubleshoot	Note 8	2b	-
	(2) Replace	Note 9	2b	-
	(3) Inspect	Note 10	2b	-
	c. Waveguides			
	(1) Remove		2b	-
	(2) Install		2b	-
	(3) Inspect		B	-
	d. Use wire repair kit	Note 9	2b	-
+++15. ***	USE TEST EQUIPMENT			
	a. Angle-of-Attack Probe		-	-
	b. Boresight Kit		-	-
	c. Box, Breakout	30620 30630	2b	-
	d. Box, Interface Combined Altitude Radar Altimeter (CARA)	30620 30630	2b	-
	e. Box, Interface Lower MUX Unit (LMU)	30620 30630	2b	-
	f. Calibrator, Compass	31010	2b	-
	g. Flightline Computer Loader (FLCL)		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
15.	USE TEST EQUIPMENT (continued)			
	h. Heat Gun, HT-900	Note 9	2b	-
	i. Mission Data Loader		-	-
	j. Optical Display Sight (ODS)		-	-
	k. Simulator, Dispense Set (AN/ALE-28)		-	-
	l. Test Set, Airborne Signal Data Recording System (SLUMP)		-	-
	m. Test Set, Auxiliary Flight Reference System (AFRS)		-	-
	n. Test Set, Beacon Transponder		-	-
	o. Test Set, Digital Flightline Tester		-	-
	p. Test Set, IFF Transponder		-	-
	q. Test Set, Instrument Landing System		-	-
	r. Test Set, Subsystem Tie-In		-	-
	s. Test Set, TACAN (AN/ARM-184)	32150 32160	2b	-
	t. Test Set, Terrain Following Radar System	30620 30630 30640	2b	-
	u. Tester, Antenna Hat (TD845/APM-181A)		-	-
	v. Tester, Fuel Quantity		-	-
	w. Tester, Microwave Integrated Diagnostic Analysis System (MIDAS)		-	-
	x. Tester, Radio Frequency (RF)		-	-
	y. Tester, Transmission Line		-	-
	z. Tester, Waveguide Pressure	30620 30630 31680	2b	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
15.	USE TEST EQUIPMENT (continued)			
	aa. Thru-Line WATT Meter	31640 31650 32190 32200	2b	-
	ab. TTU-205	Note 11	2b	-
	ac. Ultrasonic Leak Detector	Note 12	2b	-
***16.	ATTACK RADAR SYSTEM (ARS)			
*	a. Theory of operation	30190	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout and BIT		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***17.	TERRAIN FOLLOWING RADAR SYSTEM (TFR)			
*	a. Theory of operation	30630	A	B
$$$	b. Trace system diagrams	30630	B	-
**	e. Isolate malfunctions	30630	B	-
***18.	INERTIAL NAVIGATION SYSTEM (INS)			
*	a. Theory of operation	30360	A	B
$$$	b. Trace system diagrams	30360	B	-
**	e. Isolate malfunction	30360	B	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
***19.	DIGITAL COMPUTER COMPLEX (DCC)			
*	a. Theory of operation	30060	A	B
$$$	b. Trace system diagrams		-	-
	d. Perform			
	(1) Confidence test		-	-
	(2) Mode Checkout		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***20.	MISSION COMPUTER COMPLEX (MCC)			
*	a. Theory of operation	30130	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform data entry			
	(1) Automatic		-	-
	(2) Manual		-	-
	d. Perform			
	(1) Confidence test and BIT		-	-
	(2) Mode checkout		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***21.	MULTI-FUNCTION DISPLAY (MFD)			
*	a. Theory of operation	30440	A	B

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
21.	MULTI-FUNCTION DISPLAY (continued)			
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
	g. Use support equipment		-	-
***22.	CONTROL AND DISPLAY SYSTEM (CDS) (D/F MODELS ONLY)			
*	a. Theory of operation	30400	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***23.	MULTIPLEX DATA BUSSING (MUX BUSSING)			
*	a. Theory of operation	30470	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunction		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
***24.	OPTICAL SIGHT SYSTEM			
*	a. Theory of operation	30510	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Perform system boresight checks and alignments		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***25.	SHORT RANGE ATTACK MISSILE (SRAM) INERTIAL BUFFER UNIT (SIBU)(G MODEL ONLY)			
*	a. Theory of operation	30590	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove LRUs		-	-
	f. Install LRUs		-	-
***26.	INTEGRATED DISPLAY SYSTEM,(HEAD UP DISPLAY AND INDICATOR GROUP)			
*	a. Theory of operation	30400	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Perform system boresight		-	-
	e. Isolate malfunctions		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
26.	INTEGRATED DISPLAY SYSTEM,(HEAD UP DISPLAY AND INDICATOR GROUP) (continued)			
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***27.	NAVIGATIONAL RADAR (DOPPLER) SYSTEM			
*	a. Theory of operation	30320	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout and BIT		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***29.	RADAR ALTIMETER			
*	a. Theory of operation	30550	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout and BIT		-	-
	d. Perform system adjustment		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***30.	COMPACT AIRBORNE VIDEO RECORDER (CAVR) SYSTEM			
*	a. Theory of operation	30020	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
30.	COMPACT AIRBORNE VIDEO RECORDER (CAVR) SYSTEM (continued)			
	d. Perform cleaning procedures		-	-
	e. Isolation malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***31.	DATA LINK SYSTEM			
*	a. Theory of operation	30270	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. POD handling			
	(1) Transport		-	-
	(2) Upload		-	-
	(3) Download		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***32.	NOZZLE POSITION INDICATING SYSTEM			
*	a. Theory of operation	31330	A	B
	b. Trace system diagrams		-	-
	c. Isolate malfunctions		-	-
	d. Remove system indicator(s)		-	-
	e. Install system indicator(s)		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
***33.	PRESSURE INDICATING SYSTEM			
	a. Oil			
	* (1) Theory of operation	31360	A	B
	(2) Trace system diagrams		-	-
	(3) Isolate malfunctions		-	-
	(4) Remove system LRU(s)		-	-
	(5) Install system LRU(s)		-	-
	b. Hydraulic			
	* (1) Theory of operation	31300	A	B
	(2) Trace system diagrams		-	-
	(3) Isolate malfunctions		-	-
	(4) Remove system indicator(s)		-	-
	(5) Install system indicator(s)		-	-
	c. Engine Pressure Ratio (EPR)			
	* (1) Theory of operation	31120	A	B
	(2) Trace system diagrams		-	-
	(3) Perform operational checkout		-	-
	(4) Isolate malfunctions		-	-
	(5) Remove system LRU(s)		-	-
	(6) Install system LRU(s)		-	-
***34.	TURBINE INLET TEMPERATURE INDICATING SYSTEM			
	* a. Theory of operation	31560	A	B
	b. Trace system diagrams		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
34.	TURBINE INLET TEMPERATURE INDICATING SYSTEM (continued)			
	c. Perform indicator self-test		-	-
	d. Isolate malfunctions		-	-
	e. Remove system indicator(s)		-	-
	f. Install system indicator(s)		-	-
***35.	QUANTITY INDICATING SYSTEM			
	a. Fuel			
	* (1) Theory of operation	30880	A	B
	(2) Trace system diagrams		-	-
	(3) Perform operational checkout		-	-
	(4) Calibrate system		-	-
	(5) Isolate malfunctions		-	-
	(6) Remove system LRU(s)		-	-
	(7) Install system LRU(s)		-	-
	b. Oil			
	* (1) Theory of operation	31360	A	B
***36.	FUEL FLOW INDICATING SYSTEM			
	* a. Theory of operation	31230	A	B
	b. Trace system diagrams		-	-
	c. Isolate malfunctions		-	-
	d. Remove system indicator(s)		-	-
	e. Install system indicator(s)		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
***37.	TACHOMETER SYSTEM			
*	a. Theory of operation	31520	A	B
	b. Trace system diagrams		-	-
	c. Isolate malfunctions		-	-
	d. Remove system LRU(s)		-	-
	e. Install system LRU(s)		-	-
***38.	ENGINE LOW COMPRESSOR BLEED SYSTEM			
*	a. Theory of operation	31080	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***39.	AUXILIARY FLIGHT REFERENCE SYSTEM AND INSTRUMENTS			
*	a. Theory of operation	31000	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational check		-	-
	d. Swing and make compensation adjustments		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
***40.	FLIGHT DIRECTOR SYSTEM			
*	a. Theory of operation	31160	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***41.	PITOT STATIC SYSTEM AND STANDBY INSTRUMENTS			
*	a. Theory of operation	31400	A	B
	b. Trace system diagrams		-	-
	c. Perform operational check		-	-
	d. Adjust system		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***42.	AIR DATA COMPUTER SYSTEM AND PRIMARY INSTRUMENTS			
*	a. Theory of operation	30960	A	B
$$$	b. Trace system diagrams	30960	B	-
**	e. Isolate malfunctions	30960	B	-
***43.	G-EXCEEDANCE INDICATING SYSTEM			
*	a. Theory of operation	31270	A	B
$$$	b. Trace system diagrams		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
43.	G-EXCEEDANCE INDICATING SYSTEM (continued)			
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***44.	AIRBORNE SIGNAL DATA RECORDING SYSTEM			
*	a. Theory of operation	30680	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***45.	FLIGHT CONTROL POSITION INDICATING SYSTEM			
*	a. Theory of operation	30720	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Adjust system		-	-
	e. Isolate malfunctions		-	-
	f. Remove systems LRU(s)		-	-
	g. Install system LRU(s)		-	-
***46.	PRIMARY FLIGHT CONTROLS AND TRIM SYSTEM			
*	a. Theory of operation	30760	A	B
$$$	b. Trace system diagrams	30760	B	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
46.	PRIMARY FLIGHT CONTROLS AND TRIM SYSTEM (continued)			
**	e. Isolate malfunctions	30760	B	-
***47.	STABILITY AUGMENTATION/STALL INHIBITOR SYSTEM			
*	a. Theory of operation	30800	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Adjust System		-	-
	e. Isolate malfunctions		-	-
	f. Perform probe boresight		-	-
	g. Remove system LRU(s)		-	-
	h. Install system LRU(s)		-	-
***48.	AUTOMATIC FLIGHT CONTROL SYSTEM			
*	a. Theory of operation	31040	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***49.	STALL WARNING SYSTEM AND LANDING CONFIGURATION CAUTION SYSTEM (LCCS)			
*	a. Theory of operation	31480	A	B
$$$	b. Trace system diagrams		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
49.	STALL WARNING SYSTEM AND LANDING CONFIGURATION CAUTION SYSTEM (continued)			
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***50.	TRANSLATING COWL SYSTEM (Applicable to EF-111A, F-111A only)			
*	a. Theory of operation	30840	A	B
$$$	b. Trace system diagrams		-	-
	d. Adjust system		-	-
	e. Isolate malfunctions		-	-
	f. Remove system LRU(s)		-	-
	g. Install system LRU(s)		-	-
***52.	INTERCOMMUNICATION SYSTEM			
*	a. Theory of operation	31960	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***53.	HIGH-FREQUENCY (HF) COMMUNICATIONS SYSTEM			
*	a. Theory of operation	31840	A	B
$$$	b. Trace system diagrams		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
53.	HIGH-FREQUENCY (HF) COMMUNICATIONS SYSTEM (continued)			
	c. Perform operational checkout and BIT		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***55.	ULTRA-HIGH-FREQUENCY (UHF) COMMUNICATIONS SYSTEM			
*	a. Theory of operation	32200	A	B
$$$	b. Trace system diagrams	32200	B	-
**	d. Isolate malfunctions	32200	B	-
***56.	AUTOMATIC DIRECTION FINDER (ADF) SYSTEM			
*	a. Theory of operation	31760	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove systems LRU(s)		-	-
	f. Install systems LRU(s)		-	-
***57.	INSTRUMENT LANDING SYSTEM (ILS)			
*	a. Theory of operation	31880	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
57.	INSTRUMENT LANDING SYSTEM (continued)			
	e. Remove systems LRU(s)		-	-
	f. Install system LRU(s)		-	-
***58.	TACTICAL AIR NAVIGATION (TACAN) SYSTEM			
*	a. Theory of operation	32160	A	B
$$$	b. Trace system diagrams	32160	B	-
**	d. Isolate malfunction	32160	B	-
***59.	AIR-TO-GROUND IFF (AG/IFF) TRANSPONDER SYSTEM			
*	a. Theory of operation	31640	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove systems LRU(s)		-	-
	f. Install systems LRU(s)		-	-
***60.	RADAR TRANSPONDER SYSTEM (FB-111 only)			
*	a. Theory of operation	32120	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove systems LRU(s)		-	-
	f. Install system LRU(s)		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
***61.	INTEGRATED COMMUNICATION NAVIGATION AND IDENTIFICATION SYSTEM (ICNIS)			
*	a. Theory of operation	31920	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
***62.	COUNTERMEASURES RECEIVER SET (CRS)			
*	a. Theory of operation	31600	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
	g. Test transmission line		-	-
***64.	COUNTERMEASURES SET (ECM)			
*	a. Theory of operation	31680	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install systems LRU(s)		-	-
	g. Test transmission line		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
64.	COUNTERMEASURES SET (ECM) (continued)			
	h. Test pressurization		-	-
	i. Service system		-	-
***65.	INTERFERENCE BLANKER SYSTEM			
*	a. Theory of operation	32000	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove LRU		-	-
	f. Install LRU		-	-
***66.	COUNTERMEASURES DISPENSER SET (CMDS)			
*	a. Theory of operation	31800	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
	g. Service force ejectors		-	-
***67.	EXTERNAL COUNTERMEASURES SYSTEM (PODS) (Not applicable to FB-111)			
*	a. Theory of operation	31720	A	B
$$$	b. Trace system diagrams		-	-
	c. Perform operational checkout		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
67.	EXTERNAL COUNTERMEASURES SYSTEM (continued)			
	d. Isolate malfunctions		-	-
	e. Remove system LRU(s)		-	-
	f. Install system LRU(s)		-	-
	g. PODs			
	(1) Transport		-	-
	(2) Upload		-	-
	(3) Download		-	-
***69.	CRYPTO EQUIPMENT			
	b. Mode IV			
	* (1) Theory of operation	32080	A	B
	$$$ (2) Trace system diagrams		-	-
	(3) Perform operational checkout		-	-
	(4) Isolate malfunctions		-	-
	(5) Remove system LRU(s)		-	-
	(6) Install system LRU(s)		-	-
	(7) Key the system		-	-

ELECTRONIC FUNDAMENTALS/APPLICATIONS (EFA)

TRA TASK and 5-LVL CDC columns are not coded. The EFA/TRA TASK correlation is too lengthy to be included in the body of the STS and has been provided in Appendix D. There are no 5-skill-level CDC requirements.

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
1.	BASIC TERMS			
+++ a.	Metric notation		-	-
+++ b.	DC terms		-	-
+++ c.	AC terms		-	-
2.	BASIC CIRCUITS			
* a.	Theory of operation		B	-
3.	BASIC CIRCUIT CALCULATIONS			
+++ a.	DC		-	-
+++ b.	AC		-	-
4.	RESISTORS			
+++ a.	Theory of operation		-	-
+++ b.	Isolate faulty resistors		-	-
+++ c.	Color code		-	-
5.	RELAYS/SOLENOIDS			
* a.	Relay theory of operation		B	-
6.	INDUCTORS			
* a.	Theory of operation		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
7.	CAPACITORS			
+++	a. Theory of operation		-	-
+++	b. Isolate faulty capacitors		-	-
+++	c. Calculations		-	-
8.	TRANSFORMERS			
*	a. Theory of operation		B	-
+++	b. Isolate faulty transformers		-	-
9.	THREE PHASE TRANSFORMERS			
+++	a. Theory of operation		B	-
+++	b. Isolate faulty three phase transformers		2b	-
10.	DC MOTORS			
*	a. Theory of operation		B	-
+++	b. Isolate faulty DC motors		2b	-
11.	AC MOTORS			
*	a. Theory of operation		B	-
+++	b. Isolate faulty AC motors		2b	-
12.	DC GENERATORS			
+++	a. Theory of operation		-	-
13.	AC GENERATORS			
+++	a. Theory of operation		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
15.	SYNCHROS/SERVOS			
*	a. Theory of operation		B	-
+++	b. Isolate faulty synchros/servos		2b	-
+++	c. Troubleshoot synchros/servos		2b	-
17.	TRANSDUCERS			
+++	b. Isolate faulty transducers		2b	-
18.	METER MOVEMENTS			
+++	a. Theory of operation		-	-
19.	SOLID STATE DIODES			
*	a. Theory of operation		B	-
20.	BIPOLAR JUNCTION TRANSISTORS			
+++	a. Theory of operation		-	-
21.	INTEGRATED CIRCUITS			
+++	a. Familiarization		-	-
22.	SOLID STATE SPECIAL PURPOSE DEVICES			
+++	a. Theory of operation		-	-
24.	CATHODE RAY TUBES (CRTS)			
+++	a. Theory of operation		-	-
28.	TRANSISTOR AMPLIFIER CIRCUITS			
	a. Theory of operation			
+++	(1) Amplifier circuits		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
30.	OPERATIONAL AMPLIFIERS			
+++	a. Theory of operation		B	-
33.	POWER SUPPLY CIRCUITS (Half-wave, Full-wave, Full-wave bridge)			
	a. Theory of operation			
*	(1) Rectifiers (half-wave, full-wave, (full-wave bridge)		B	-
*	(2) Filters (Capacitive, Inductive, L-section, Pi-section)		B	-
34.	Voltage Regulators (Shunt, Series EVR, IC EVR)			
+++	a. Theory of operation		-	-
35.	RESISTIVE/CAPACITIVE/INDUCTIVE (RCL) CIRCUITS			
*	a. Basic operation		B	-
+++	b. Resonant operation		-	-
+++	c. Troubleshoot circuits		2b	-
+++	d. Calculations		-	-
36.	FREQUENCY SENSITIVE FILTERS			
+++	a. Theory of operation		-	-
37.	WAVE GENERATING CIRCUITS			
	a. Theory of operation			
+++	(1) Oscillators (LC, RC, Crystal)		B	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
+++	(2) Multivibrators (Astable, Bistable, Monostable)		-	-
+++	(3) Waveshaping Circuits (Schmitt Trigger, Sawtooth, RC Integ/Diff)		-	-
40.	DIGITAL NUMBERING SYSTEMS			
*	a. Conversions		B	-
*	b. Math operations		B	-
+++	c. Binary Code Systems		-	-
41.	DIGITAL LOGIC FUNCTIONS			
*	a. Theory of operation		B	-
42.	BOOLEAN EQUATIONS			
+++	a. Diagram to equation		-	-
+++	b. Equation to diagram		-	-
43.	COMPUTERS			
*	a. Operation principles		B	-
+++	f. Types of memories		-	-
+++	g. Peripheral devices		-	-
46.	D/A, A/D CONVERTERS			
+++	a. Theory of operation		-	-
47.	TRANSMISSION LINES			
*	a. Theory of operation		B	-
+++	d. Isolate faulty transmission lines		2b	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
48.	WAVEGUIDES			
+++	a. Theory of operation		B	-
+++	b. Isolate faulty waveguides		2b	-
49.	MICROWAVE OSCILLATORS & AMPLIFIERS			
+++	a. Theory of operation		-	-
50.	RESONANT CAVITIES			
+++	a. Theory of operation		-	-
51.	TRANSMITTERS			
	a. Theory of operation			
*	(1) Amplitude modulation		-	-
+++	(2) Frequency modulation		B	-
*	(3) Single side band		-	-
+++	(4) Pulse modulation		B	-
52.	RECEIVERS			
	a. Theory of operation			
*	(1) Amplitude modulation		B	-
*	(2) Frequency modulation		B	-
+++	(3) Single side band		-	-
*	(4) Pulse modulation		B	-
53.	TRANSMISSION POWER			
+++	a. Perform measurements		-	-

STS #	STS ITEM	TRA TASK	3 LVL CRS	5 LVL CDC
54.	ANTENNAS			
*	a. Theory of operation		B	-
+++	c. Isolate faulty antennas		2b	-
55.	MICROPHONES			
+++	a. Theory of operation		-	-
56.	SPEAKERS			
+++	a. Theory of operation		-	-
59.	SUPPORT SUBJECTS			
*	a. Safety applicable to electronics		-	-
*	c. Electrostatic sensitive device control		B	-

Summary of Proposed Changes

STS

The following changes are recommended to the STS. STS items have been added, deleted, or revised. The STS element number is followed by the rationale for the change.

1. 3h - deleted hydrazine hazards. Not applicable to the F-111 aircraft.

2. 4d - removed proficiency code from 3-level course. Item is not performed by 3-levels.

3. 6 - deleted by HQ ATC direction.

4. 13c - changed "Use common tools" to "Use common handtools" to match the task analysis.

5. 14a-d - added codes to the 3-level course to allow training on common skill and knowledge requirements

6. 15a-ac - centrally located all test equipment and removed from individual systems.

7. 54 - deleted AFSATCOM. No longer applicable to the F-111 aircraft.

EFA

All changes, except those identified as AFR 8-13 changes, are proficiency code changes. These code changes reflect the difference in current training requirements and the requirements recommended by the analysis.

STS Notes for TRA Correlation

NOTE 1: 30040, 30090, 30170, 30210, 30250, 30300, 30340, 30380, 30420, 30460, 30490, 30530, 30570, 30610, 30650, 30700, 30740, 30780, 30820, 30860, 30900, 30940, 30980, 31020, 31060, 31100, 31140, 31180, 31220, 31250, 31290, 31320, 31350, 31380, 31420, 31460, 31510, 31540, 31580, 31620, 31660, 31700, 31740, 31780, 31820, 31860, 31900, 31940, 31980, 32020, 32060, 32100, 32140, 32180, 32220

NOTE 2: 30010, 30020, 30050, 30060, 30130, 30180, 30190, 30220, 30230, 30260, 30270, 30320, 30390, 30400, 30550, 30560, 30620, 30630, 30670, 30680, 30690, 30710, 30720, 30730, 30750, 30760, 30770, 30790, 30800, 30830, 30840, 30890, 31030, 31040, 31110, 31120, 31150, 31160, 31200, 31230, 31330, 31340, 31360, 31370, 31470, 31480, 31520, 31590, 31600, 31620, 31630, 31640, 31650, 31750, 31760, 31790, 31800, 31830, 31840, 31870, 31880, 31950, 31960, 32070, 32080, 32110, 32120, 32150, 32160

NOTE 3: 30630, 30670, 30680, 30690, 30710, 30720, 30730, 30750, 30760, 30770, 30790, 30800, 30830, 30840, 31030, 31040, 31050, 31430, 31440

NOTE 4: 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32030, 32040, 32050, 32090, 32130, 32170, 32210, 32280

NOTE 5: 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32050, 32090, 32110, 32120, 32130, 32150, 32160, 32170, 32210, 32280

NOTE 6: 30190, 30620, 30630, 31440, 31820

NOTE 7: 30010, 30020, 30030, 30050, 30060, 30070, 30080, 30090, 30100, 30110, 30120, 30130, 30140, 30150, 30160, 30180, 30190, 30200, 30210, 30220, 30230, 30240, 30260, 30270, 30280, 30290, 30310, 30320, 30330, 30340, 30350, 30360, 30370, 30380, 30390, 30400, 30410, 30430, 30440, 30450,

30470, 30480, 30500, 30510, 30520, 30530, 30540, 30550,
30560, 30580, 30590, 30600, 30620, 30630, 30640, 30660,
30670, 30680, 30690, 30710, 30730, 30750, 30760, 30770,
30790, 30800, 30830, 30840, 30850, 30870, 30880, 30890,
30910, 30920, 30930, 30950, 30960, 30970, 30990, 31000,
31010, 31030, 31040, 31070, 31080, 31090, 31110, 31120,
31130, 31150, 31160, 31170, 31190, 31200, 31210, 31230,
31240, 31280, 31300, 31310, 31320, 31330, 31340, 31360,
31370, 31390, 31400, 31410, 31430, 31440, 31450, 31470,
31480, 31490, 31500, 31520, 51530, 31550, 31560, 31570,
31590, 31600, 31610, 31620, 31630, 31640, 31650, 31670,
31680, 31690, 31710, 31720, 31730, 31740, 31750, 31760,
31770, 31790, 31800, 31810, 31820, 31830, 31840, 31850,
31870, 31880, 31890, 31910, 31920, 31930, 31950, 31960,
31970, 31990, 32000, 32010, 32030, 32040, 32050, 32070,
32080, 32090, 32100, 32110, 32120, 32130, 32150, 32160,
32170, 32190, 32200, 32210, 32220, 32230, 32240, 32250,
32260, 32270, 32280

NOTE 8: 30020, 30060, 30130, 30190, 30230, 30270, 30320, 30360,
30400, 30440, 30470, 30510, 30550, 30590, 30630, 30680,
30720, 30760, 30800, 30840, 30920, 30960, 31000, 31040,
31080, 31120, 31200, 31270, 31300, 31330, 31360, 31400,
31480, 31520, 31560, 31600, 31640, 31680, 31720, 31760,
31800, 31840, 31880, 31920, 31960, 32000, 32040, 32080,
32120, 32160, 32200

NOTE 9: 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370,
30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690,
30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970,
31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280,
31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610,
31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930,
31970, 32010, 32050, 32090, 32130, 32170, 32210

NOTE 10: 30020, 30060, 30130, 30190, 30200, 30230, 30270, 30320,
30360, 30400, 30440, 30470, 30510, 30550, 30590, 30630,
30680, 30690, 30720, 30730, 30760, 30800, 30840, 30880,
30920, 30960, 31000, 31040, 31080, 31120, 31200, 31270,
31300, 31330, 31360, 31400, 31480, 31520, 31560, 31600,
31640, 31680, 31720, 31760, 31800, 31840, 31880, 31920,
31960, 32000, 32040, 32080, 32120, 32160, 32200, 32270

NOTE 11: 30830, 30840, 30950, 30960, 31080, 31110, 31120, 31150,
31160, 31390, 31400, 31430, 31450

NOTE 12: 30190, 30630, 30960, 31400, 31440, 31680

APPENDIX D
ELECTRONIC FUNDAMENTALS/APPLICATION (EFA) TRA TASK CORRELATION

The numbers in the EFA No. column, for the most part, relate to the element numbers in the EFA. In places, the numbers end in an "x," "y," or "z." On these occasions, the numbers do not relate directly to the EFA line items, but do relate to the EFA major fundamental requirements. Beside each EFA number is the activity (A), skill (S), or knowledge (K) statement used in the TRA. The numbers below the statements refer to the TRA tasks where the activity, skill, or knowledge is required.

EFA No.		TRA TASK STATEMENT AND NUMBERS
2A1	K	APPLY DC CIRCUIT THEORY OF OPERATION 30060, 30190, 30230, 30270, 30360, 30400, 30510, 30550, 30630, 30680, 30720, 30760, 30800, 30960, 31000, 31040, 31080, 31120, 31160, 31200, 31230, 31300, 31330, 31360, 31600, 31640, 31680, 31760, 31800
2A2	K	APPLY AC CIRCUIT THEORY OF OPERATION 30060, 30190, 30270, 30360, 30400, 30510, 30550, 30630, 30680, 30720, 30760, 30800, 30880, 30960, 31000, 31040, 31080, 31120, 31160, 31200, 31230, 31300, 31330, 31360, 31600, 31640, 31680, 31800
2B1	K	TROUBLESHOOT DC CIRCUITS 30230, 30270, 30510, 30680, 30720, 30760, 30800, 30960, 31040, 31080, 31120, 31160, 31200, 31230, 31300, 31330, 31360, 31600, 31760, 31800
2B2	K	TROUBLESHOOT AC CIRCUITS 30270, 30510, 30680, 30720, 30760, 30800, 30880, 30960, 31040, 31080, 31120, 31160, 31200, 31230, 31300, 31330, 31360, 31600, 31800
4A	K	APPLY RESISTOR THEORY OF OPERATION 31600
5A	K	APPLY RELAY THEORY OF OPERATION 30060, 30190, 30270, 30270, 30360, 30510, 30550, 30630, 30680, 30720, 30760, 30800, 30840, 30880, 31000, 31040, 31080, 31160, 31200, 31600, 31640, 31760
5B	K	ISOLATE FAULTY RELAYS 30060, 30190, 30230, 30270, 30360, 30510, 30550, 30630, 30680, 30720, 30760, 30800, 30840, 30880, 31000, 31040, 31080, 31160, 31200, 31600, 31640
5C	K	APPLY SOLENOID THEORY OF OPERATION 30720, 31600
5Y1	K	TROUBLESHOOT RELAYS 30060, 30190, 30360, 30510, 30550, 30630, 30680, 30720, 31600

EFA No.		TRA TASK STATEMENT AND NUMBERS
7A	K	APPLY CAPACITOR THEORY OF OPERATION 30880
7B	K	ISOLATE FAULTY CAPACITORS 30880
7C	A	PERFORM CAPACITOR CALCULATIONS 30880
8A	K	APPLY TRANSFORMER THEORY OF OPERATION 30760, 30800, 31040
8B	K	ISOLATE FAULTY TRANSFORMERS 30760
9A	K	APPLY THREE-PHASE TRANSFORMER THEORY OF OPERATION 31300, 31330, 31360
9B	K	ISOLATE FAULTY THREE-PHASE TRANSFORMERS 31300, 31330, 31360
10A	K	APPLY DC MOTOR THEORY OF OPERATION 30760, 31160
10B	K	ISOLATE FAULTY DC MOTORS 30760, 31160
10C	K	TROUBLESHOOT DC MOTORS 30760
11A	K	APPLY AC MOTOR THEORY OF OPERATION 30760, 31160, 31520
11B	K	ISOLATE FAULTY AC MOTORS 30760, 30800, 31160, 31520
11C	K	TROUBLESHOOT AC MOTORS 30760
12A	K	APPLY DC GENERATOR THEORY OF OPERATION 30760
12B	K	ISOLATE FAULTY DC GENERATORS 30760
13A	K	APPLY AC GENERATOR THEORY OF OPERATION 30760
13B	K	ISOLATE FAULTY AC GENERATORS 30760

EFA No.		TRA TASK STATEMENT AND NUMBERS
15A	K	APPLY SYNCHRO/SERVO THEORY OF OPERATION 30190, 30360, 30510, 30630, 30680, 30720, 30800, 31120, 31160, 31200, 31230, 31300, 31330, 31360, 31760
15B	K	ISOLATE FAULTY SYNCHROS/SERVOS 30680, 30720, 31120, 31160, 31200, 31230, 31300, 31330, 31360
15C	K	TROUBLESHOOT SYNCHROS/SERVOS 30630, 30680, 30720
17A	K	APPLY TRANSDUCER THEORY OF OPERATION 30800, 31040, 31120
17B	K	ISOLATE FAULTY TRANSDUCERS 31040, 31120
19A	K	APPLY SOLID STATE DIODE THEORY OF OPERATION 30060, 30190, 30400, 30550, 30630, 30720, 30760, 30800, 31000, 31040, 31600
19B	K	ISOLATE FAULTY SOLID STATE DIODES 30550, 30760, 30800
20A	K	APPLY BIPOLAR JUNCTION TRANSISTOR THEORY OF OPERATION 30720
22A4	K	APPLY LED THEORY OF OPERATION 31600
24A	K	APPLY CATHODE-RAY TUBE THEORY OF OPERATION 30400
25A	S	SOLDER/DESOLDER TERMINAL CONNECTIONS 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32050, 32090, 32130, 32170, 32210
25C	S	SOLDER/DESOLDER MULTIPIN CONNECTORS 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32050, 32090, 32130, 32170, 32210

EFA No.		TRA TASK STATEMENT AND NUMBERS
26A	S	ASSEMBLE SOLDERLESS CRIMP CONNECTORS 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32050, 32090, 32130, 32170, 32210
26B	S	ASSEMBLE SOLDERLESS COAXIAL CONNECTORS 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32050, 32090, 32130, 32170, 32210
26C	S	ASSEMBLE SOLDERLESS MULTIPIN CONNECTORS 30030, 30080, 30160, 30200, 30240, 30280, 30330, 30370, 30410, 30450, 30480, 30520, 30560, 30600, 30640, 30690, 30730, 30770, 30810, 30850, 30880, 30890, 30930, 30970, 31010, 31050, 31090, 31130, 31170, 31210, 31240, 31280, 31310, 31340, 31370, 31450, 31490, 31530, 31570, 31610, 31650, 31690, 31730, 31770, 31810, 31850, 31890, 31930, 31970, 32010, 32050, 32090, 32130, 32170, 32210
27A	S	USE ANALOG MULTIMETER 30550, 30630, 30640, 31230, 31260, 31990, 32270
27B	S	USE OSCILLOSCOPE 30190, 30400, 30630, 31600, 31990, 32000, 32040
27E	S	USE SPECTRUM ANALYZER 32030
27G	S	USE DIGITAL MULTIMETER 30550, 30630, 30640, 31230, 31260, 31990, 32270
27H	S	USE DIGITAL LOGIC PROBE 31230
27Q	S	USE REFLECTOMETER 31990, 32270
30A	K	APPLY OPERATIONAL AMPLIFIER THEORY OF OPERATION 30760, 31040
30B	K	ISOLATE FAULTY OPERATIONAL AMPLIFIERS 30760
30Y	K	TROUBLESHOOT OPERATIONAL AMPLIFIERS 30760

EFA No.		TRA TASK STATEMENT AND NUMBERS
33A	K	APPLY POWER SUPPLY THEORY OF OPERATION 30190, 30800, 31040
33B	K	ISOLATE FAULTY POWER SUPPLIES 30190
35A	K	APPLY RCL CIRCUIT THEORY OF BASIC OPERATION 30720, 31200
35C	K	TROUBLESHOOT RCL CIRCUITS 30680, 30720
35X	K	ISOLATE FAULTY RCL CIRCUITS 30680, 30720
36A	K	APPLY FREQUENCY SENSITIVE FILTER THEORY OF OPERATION 30800
37A1	K	APPLY OSCILLATOR CIRCUIT THEORY OF OPERATION 30190, 30630
38A1	K	APPLY LIMITER CIRCUIT DIODE THEORY OF OPERATIONS 31040
38A2	K	APPLY LIMITER CIRCUIT ZENER DIODE THEORY OF OPERATION 31040
38A3	K	APPLY LIMITER CIRCUIT TRANSISTOR THEORY OF OPERATION 31040
40A1	K	PERFORM BINARY CONVERSIONS 30050, 30060, 30070, 30670, 30680, 30690, 32040
40A2	K	PERFORM OCTAL CONVERSIONS 30050, 30060, 30070, 32040
40A3	K	PERFORM HEXADECIMAL CONVERSIONS 32040
40B2	K	PERFORM OCTAL MATH OPERATION 30050, 30060, 30070, 30360
41A1	K	APPLY MAIN LOGIC GATE THEORY OF OPERATION 30360, 30400, 30630, 30800, 31040
43A	K	APPLY COMPUTER THEORY OF OPERATION 30960, 31160, 31600
47A	K	APPLY TRANSMISSION LINE THEORY OF OPERATION 31600, 31680
47D	K	ISOLATE FAULTY TRANSMISSION LINES 31600, 31680

EFA No.		TRA TASK STATEMENT AND NUMBERS
48A	K	APPLY WAVEGUIDE THEORY OF OPERATION 30190, 30630, 31680
48B	K	ISOLATE FAULTY WAVEGUIDES 30190, 30630, 31680
49A	K	APPLY MICROWAVE OSCILLATOR OR AMPLIFIER THEORY OF OPERATION 30190
50A	K	APPLY RESONANT CAVITY THEORY OF OPERATION 30630
50C	K	TUNE OR ADJUST RESONANT CAVITIES 30630
50Y	K	TROUBLESHOOT RESONANT CAVITIES 30630
51A2	K	APPLY FM TRANSMITTER THEORY OF OPERATION 30190, 30630
51A4	K	APPLY PULSE MODULATION TRANSMITTER THEORY OF OPERATION 30190, 30550
52A1	K	APPLY AM RECEIVER THEORY OF OPERATION 30680, 31600
52A2	K	APPLY FM RECEIVER THEORY OF OPERATION 30190, 30630, 31600
52A4	K	APPLY PULSE MODULATION RECEIVER THEORY OF OPERATION 30190, 30550, 31600
54A	K	APPLY ANTENNA THEORY OF OPERATION 30190, 30550, 30630
54C	K	ISOLATE FAULTY ANTENNAS 30630, 31160, 31600
54Y	K	TROUBLESHOOT ANTENNAS 30630, 31600, 31640
59C	K	APPLY ELECTROSTATIC DISCHARGE CONTROL (ESD) PRECAUTIONS 30660, 61200

APPENDIX E
ACRONYM LIST

ACRONYM	DEFINITION
AA	AIR TO AIR
AC	ALTERNATING CURRENT
ADC	AIR DATA COMPUTER
ADF	AUTOMATIC DIRECTION FINDER
AFRS	AUXILIARY FLIGHT REFERENCE SYSTEM
AG	AIR TO GROUND
AM	AMPLITUDE MODULATION
AOA	ANGLE OF ATTACK
ARS	ATTACK RADAR SYSTEM
ASDR	AIRBORNE SIGNAL DATA RECORDER
BIT	BUILT-IN-TEST
CADC	CENTRAL AIR DATA COMPUTER
CAVR	COMPACT AIRBORNE VIDEO RECORDER
CDS	CONTROL AND DISPLAY SYSTEM
CMDS	COUNTERMEASURES DISPENSER SET
CMDS	COUNTERMEASURES DISPENSER SYSTEM
CRS	COUNTERMEASURE RECEIVER SYSTEM
CTK	CONSOLIDATED TOOL KIT
DC	DIRECT CURRENT
DCC	DIGITAL COMPUTER COMPLEX
DG	DIRECTIONAL GYRO
ECM	ELECTRONIC COUNTERMEASURE
EPR	ENGINE PRESSURE RATIO
ESD	ELECTROSTATIC DISCHARGE
FDC	FLIGHT DIRECTOR COMPUTER
GHRP	GROUND HAZARD RADIATION PROTECTION
HF	HIGH FREQUENCY
HUD	HEAD UP DISPLAY
ICNIS	INTEGRATED COMMUNICATION NAVIGATION AND IDENTIFICATION SYSTEM
IDS	INTEGRATED DISPLAY SYSTEM
IFF	IDENTIFICATION FRIEND OR FOE
ILS	INSTRUMENT LANDING SYSTEM
INS	INERTIAL NAVIGATION SYSTEM
IRS	IMPROVED RADAR SIMULATOR
JSS	JAMMING SUBSYSTEM
LARA	LOW ALTITUDE RADAR ALTIMETER
LCC	LANDING CONFIGURATION CAUTION
LMU	LOWER MUX UNIT
LRU	LINE REPLACEABLE UNIT
MCC	MISSION COMPUTER COMPLEX
MFD	MULTIFUNCTION DISPLAY
MICAP	MISSION CAPABILITY
MLV	MISSION LOAD VERIFIER
MSMA	MAXIMUM SAFE MACH ASSEMBLY
MUX BUSS	MULTIPLEX DATA BUSS
NCU	NAVIGATION COMPUTER UNIT
NDI	NONDESTRUCTIVE INSPECTION
OFP	OPERATIONAL FLIGHT PROGRAM
OSS	OPTICAL SIGHT SYSTEM

ACRONYM	DEFINITION
PDG	PROGRAMMABLE DISPLAY GENERATOR
R/T	RECEIVER TRANSMITTER
RCL	RESISTIVE, CAPACITIVE, INDUCTIVE
RF	RADIO FREQUENCY
RWR	RADAR WARNING RECEIVER
SAS	STABILITY AUGMENTATION SYSTEM
SDR	SIGNAL DATA RECORDER
SIBU	SRAM INERTIAL BUFFER UNIT
SIS	STALL INHIBITOR SYSTEM
SRAM	SHORT RANGE ATTACK MISSILE
TACAN	TACTICAL AIR NAVIGATION
TFR	TERRAIN FOLLOWING RADAR
TO	TECHNICAL ORDER
TSLVC	TEST SET LOAD VERIFY COMPUTER
UHF	ULTRA HIGH FREQUENCY